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PRODUCTION SECTION
PAPER MATERIAL RECORDS

United States
Department of
Agriculture

Forest Service

Forest
Products
Laboratory



Dividends From Wood Research

Recent Publications

January through June 1982

adhesives

1. A Method for Measuring Adhesive Shear Properties

River, Bryan H.

Adhesives Age 24(12): 30-33, 1981

To give the designer more information about the mechanical properties of adhesives, a method is described here for designing and testing single lap shear specimens to measure adhesive shear properties.

2. Bond Formation by Wood Surface Reactions: Part I - Surface Analysis by ESCA

Young, R. A., R. M. Rammon, S. S. Kelley, and R. H. Gillespie

Wood Sci. 14(3): 110-119, 1982

The chemical composition of wood surfaces that have been bonded by nitric acid and periodate activation are analyzed by electron spectroscopy (ESCA). Results indicate an important feature of bond formation by surface reactions is oxidation to carbonyl- and carboxyl-type functional groups.

anatomy & properties

3. Wood Anatomy of the New World *Pithecellobium* (*Sensu Lato*)

Cassens, Daniel L. and Regis B. Miller

Journal of the Arnold Arboretum 62(1): 1-44, 1981

To help develop a more acceptable classification system for New World *Pithecellobium*, the authors have investigated secondary xylem as well as relationships and specialization levels of different tissues. Fifteen wood types are anatomically described.

4. Examination of the Concomitant Properties of Lumber

Galligan, W. L., Richard A. Johnson, and James R. Taylor

From: Metal Plate Wood Truss Conference, Forest Products Research Society, Madison, Wis., pp. 65-70, 1981

Through statistical analysis this paper examines the concomitant effects of bending and tensile strength and of bending and compressive strength of truss lumber.

5. Species, Grades, and Mechanical Properties of Lumber Samples from Truss Fabricators

Gerhards, Charles C. and Donald H. Percival

From: Metal Plate Wood Truss Conference, Forest Products Research Society, Madison, Wis., pp. 21-25, 1981

This study characterizes the mechanical properties of lumber typically used in wood trusses in a format suitable for structural reliability analysis.

6. Surfacing Small Specimens of Dry Wood

Quirk, J. Thomas

Microscopica Acta 85(1): 1-5, 1981

This paper discusses some variations of a basic technique using hydrocarbons that allows for cutting burr-free, cross-sectional surfaces of wood without distortion. A quick and easy "hot dipping" method is described along with a freezing technique that is more time consuming but provides excellent surfaces.

buildings & construction

7. FPL Light-Frame Research Program

Galligan, William L.

From: Metal Plate Wood Truss Conference, Forest Products Research Society, Madison, Wis., pp. 13-16, 1981

The light-frame construction program is a cooperative effort between FPL and several universities that seek sound construction practices and more efficient wood use. This article highlights those elements of the program that can help meet some of today's resource needs.

8. Field Sound Insulation of Load-Bearing Sandwich Panels for Housing

Jones, Robert E.

Noise Control Engineering 16(2): 90-105, 1981

The author demonstrates that for most uses in multifamily dwellings, the basic sandwich panel must be upgraded to meet current codes and guides.

9. Moisture Control in Retrofit Insulation

Sherwood, G. E.

Trans. of the ASAE 24(5): 1296-1298, 1981

Based on recent FPL studies on a test structure simulating an older home, this paper presents information on moisture control measures in retrofitte homes.

"Dividends From Wood Research" is a semiannual listing of recent publications resulting from wood utilization research at the Forest Products Laboratory. These publications are made available to the public to encourage private and commercial appli-

cation of Forest Service research. The Forest Products Laboratory is maintained in Madison, Wisconsin, by the Forest Service, U.S. Department of Agriculture, in cooperation with the University of Wisconsin.

chemistry

10. Triterpenes from Douglas-Fir Sapwood

Conner, Anthony H. and Daniel O. Foster

Phytochemistry 20(11): 2543-2546, 1981

During investigation of Douglas-fir extractives, an unidentified triterpene alcohol was isolated. It is a mixture of three triterpenes and represents the first reported occurrence of cycloecualanol as a natural product, and of cycloecalenol and 24-methyllophenol from Douglas-fir.

11. Argentation Resin Chromatography of Diterpene Resin Acids

Curran, S. S. and D. F. Zinkel

J. of Am. Oil Chem. Society 58(11): 980-982, 1981

This paper describes the extension of the silver sulfonate resin technique to the chromatographic separation of diterpene resin acids.

12. Chapter 9: Turpentine, Rosin, and Fatty Acids from Conifers

Zinkel, Duane F.

From: Organic Chemicals from Biomass, pp. 163-187, I. S. Goldstein, ed., CRC Press, Boca Raton, Fla., 1981

This overview of naval stores commodities includes historical background, composition and current uses, production statistics and techniques, as well as future uses.

degradation & protection

13. Effects of Molecular Oxygen on Lignin Degradation by *Phanerochaete chrysosporium*

Bar-Lev, S. S. and T. Kent Kirk

Biochem. Biophys. Res. Commun. 99(2): 373-378, 1981

Previous research showed that shallow stationary cultures of white-rot wood-destroying Basidiomycetes degrade lignin at much higher rates under oxygen than under air. This study with *P. chrysosporium* shows that the rates are affected in two stages.

14. New or Little Known Lignicolous Aphyllophorales (Basidiomycotina) from Southeastern United States

Burdssall, H. H. Jr., and K. K. Nakasone

Mycologia 73(3): 454-476, 1981

Eleven species of Corticiaceae and Steccherinaceae (Aphyllophorales) are described and illustrated.

15. New Species of *Gloeocystidiellum* (Corticiaceae) from the Southeastern United States

Burdssall, H. H. Jr., K. K. Nakasone, and Glenn W. Freeman

Systematic Botany 6(4): 422-434, 1981

Studies of lignicolous fungi of the southeastern United States have revealed six new species of *Gloeocystidiellum* (Corticiaceae) that are described and illustrated in this article.

16. Ability of Isolates of *Confertobasidium olivaceo-album* to Stain and Decay Wood

Eslyn, W. E.

Can. J. Forest Res. 11(3): 497-501, 1981

Ten different isolates of the fungus *C. olivaceo-album* were tested to determine optimum temperature for growth and capability to stain and decay wood. Results indicate the fungus is unimportant in deterioration of wood in use.

17. Wood Decay Inhibition by Tropical Hardwood Extractives and Related Compounds

Eslyn, Wallace E., John E. Bultman, and Leonard Jurd

Phytopathology 71(5): 521-524, 1981

Tests were conducted to determine wood's resistance to decay fungi

when it is impregnated with the tropical wood extractives obtusaquinone, obtusastyrene, and lapachol, as well as with a phenolic compound.

18. Decay Resistance of Red Pine Wood Chips Enriched with Oleoresin

Eslyn, Wallace E. and Karl E. Wolter

Phytopathology 71(12): 1248-1251, 1981

This study shows wood chip storage piles consisting predominately of lightwood should undergo reduced biological deterioration and initial heating.

19. Ligninolytic Activity of *Phanerochaete chrysosporium*: Physiology of Suppression by NH₄⁺ and L-Glutamate

Fenn, Patrick, Suki Choi, and T. Kent Kirk

Arch. of Microbiol. 130: 66-71, 1981

This study and earlier investigations show that certain nitrogenous compounds suppress lignin degradation in wood by repressing a key enzyme(s) associated with degradation.

20. Relationship of Nitrogen to the Onset and Suppression of Ligninolytic Activity and Secondary Metabolism in *Phanerochaete chrysosporium*.

Fenn, Patrick and T. Kent Kirk

Arch. of Microbiol. 130: 59-65, 1981

This study examined amino acid profiles and protein concentration during onset of ligninolytic activity in nitrogen-limited cultures of the white-rot fungus *P. chrysosporium*.

21. Using Fumigants to Control Interior Decay in Waterfront Timbers

Highley, Terry L. and Wallace E. Eslyn

For. Prod. J. 32(2): 32-34, 1982

This study showed that Vapam (sodium N-methyl dithiocarbamate) and chloropicrin were effective in controlling decay fungi in horizontal, above-water timber, but they were not as effective in controlling molds.

22. Polysaccharide-Degrading Complex Produced in Wood and in Liquid Media by the Brown-Rot Fungus *Poria Placenta*

Highley, Terry L., Karl E. Wolter, and Faye J. Evans

Wood and Fiber 13(4): 265-274, 1981

The paper compares qualitatively and quantitatively the polysaccharide-degrading enzyme produced by *P. placenta* in wood with those produced in liquid culture.

23. Catalase-Aminotriazole Assay, an Invalid Method for Measurement of Hydrogen Peroxide Production by Wood Decay Fungi

Highley, Terry L.

Appl. and Environ. Microbiol. 42(5): 925-927, 1981

This study shows that enzyme preparations from wood-decay fungi should be purified to remove catalase inhibitors when the C-At method is used to measure H₂O₂ production.

24. Candidate Wood-Base Standard Reference Materials for Fire Testing—Red Oak

Holmes, Carlton A. and Martin Chudnoff

USDA For. Serv. Res. Pap. FPL 404, 1981

Efforts to use red oak as a standard reference for nationwide fire testing have been abandoned due to the decreased use anticipated in the future. Instead, the authors recommend investigation of a reconstituted wood product for this purpose.

25. Free Radical Formation in Wood: The Role of Water

Hon, David N.-S., and William C. Feist

Wood Sci. 14(1): 41-48, 1981

Electron spin resonance spectroscopy is used to study the effect of moisture on the formation and behavior of wood free radicals generated by fluorescent light.

26. Nutritional Regulation of Lignin Degradation by *Phanerochaete chrysosporium*

Jeffries, Thomas W., Suki Choi, and T. Kent Kirk

Appl. and Environ. Microbiol. 42(2): 190-196, 1981

The lignolytic system of *P. chrysosporium* is examined to determine the effects of limiting carbohydrate, sulfur, or phosphorous and varying the concentrations of four trace metals, Ca^{2+} , and Mg^{2+} .

27. Toward Elucidating the Mechanism of Action of the Ligninolytic System in Basidiomycetes

T. Kent Kirk

From: "Trends in the Biology of Fermentations for Fuels and Chemicals", Alexander Hollaender, ed., Plenum Press, New York, pp. 131-148, 1981

This paper summarizes current understanding of the physiology and chemistry of white-rot fungi as they act on lignin and possible biochemistry of lignin polymer degradation.

28. Synthesis of ^{14}C Labeled 3-Methoxy-4-Hydroxy- α -(2-Methoxy-phenoxy)- β -Hydroxypipophenone, a Lignin Model Compound

Landucci, Lawrence L., Sally A. Geddes, and T. Kent Kirk

Holzforschung 35: 66-70, 1981

Described here is the synthesis of the uniformly A-ring-labeled structure in the title from commercially available [Ring-U- ^{14}C]-phenol, via guaiacol. The synthesis is suitable for small-scale operations.

29. Cultural and Morphological Studies of *Gloeocystidiellum porosum* and *Gloeocystidium clavuligerum*

Nakasone, K. K.

Mycotaxon 14(1): 316-324, 1982

Evidence for recognizing the fungus *Gloeocystidium clavuligerum* as distinct from the fungus *Gloeocystidiellum porosum* is presented.

30. A New Species, *Phlebia brevispora*, A Cause of Internal Decay in Utility Poles

Nakasone, K. K. and W. E. Eslyn

Mycologia 73(5): 803-810, 1981

A new species, *Phlebia brevispora*, is proposed for the fungus previously identified as *Peniophora A*. The study shows the decay capability of *P. brevispora* in southern pine wood is substantial.

31. Involvement of Singlet Oxygen in the Fungal Degradation of Lignin

Nakatsubo, Fumiaki, Ian D. Reid, and T. Kent Kirk

Biochem. Biophys. Res. Commun. 102(1): 484-491, 1981

This study examines the effects of $^{1}\text{O}_2$ (singlet oxygen) in the degradation of lignin by the fungus *Phanerochaete chrysosporium*. Results indicate the $^{1}\text{O}_2$ plays an integral role in lignin biodegradation.

32. Microbiology of Wetwood: Importance of Pectin Degradation and *Clostridium* Species in Living Trees

Schink, Bernhard, James C. Ward, and J. G. Zeikus

Appl. and Environ. Microbiol. 42(3): 526-532, 1981

The importance of anaerobic pectin decomposition in wetwood is examined.

33. Microbiology of Wetwood: Role of Anaerobic Bacterial Populations in Living Trees

Schink, Bernhard, James C. Ward, and J. G. Zeikus

J. Gen. Microbiol. 123: 313-322, 1981

The authors quantify aerobic and anaerobic microbial populations associated with wetwood and relate the metabolic properties of prevalent wetwood bacteria to chemical and structural features of wetwood.

design data

34. Appendix I: Specific Weibull Distribution Concerns

Appendix II: Descriptions of Samples for Visual and Machine-Graded Lumber

Haskell, James H.

From: Metal Plate Wood Truss Conference, Forest Products Research Society, Madison, Wis., pp. 52-64, 1981

Appendix I summarizes several concerns of the Weibull distribution—estimation procedure, tolerance limits, and selection rules for distributions. Appendix II presents graphs of samples for visual and machine-graded lumber using histograms and normal, lognormal, and Weibull distribution.

35. Characterizing Lumber Properties for Truss Research

Hoyle, Robert J. Jr., William L. Galligan, and James H. Haskell

From: Metal Plate Wood Truss Conference, Forest Products Research Society, Madison, Wis., pp. 32-51, 1981

With the help of many illustrations, this paper describes and summarizes the nature of some of the data identified and employed for metal-plate wood truss analysis.

36. Methodology to Evaluate Racking Resistance of Nailed Walls

Itani, Rafik Y., Roger L. Tuomi, and William J. McCutcheon

For. Prod. J. 32(1): 30-36, 1982

A methodology is presented for calculating the racking performance of sheathed wood-stud walls that allows complex wall configurations to be analyzed quickly and easily by general purpose computer programs.

37. Effect of Lumber Width and Tension Lamination Quality on the Bending Strength of Four-Ply Laminated Beams

Marx, Catherine M. and Russell C. Moody

For. Prod. J. 32(1): 45-52, 1982

This study determines: 1) relative strengths of beams with three tension lamination grades, 2) which quality of tension lamination provides desired design strength level, and 3) if a significant strength difference exists between glulam beams made from different widths of lumber.

general

38. Evaluating Concepts for the Improved Utilization of Tropical Timber Resources

Chudnoff, M. and R. L. Youngs

Unasylva 32(128): 27-28, 1980

These authors state that among general concepts that might improve utilization of tropical forests, the any-tree/whole tree concept has the greatest potential for marketing the lesser used species today.

39. U.S. Wood-Based Industry Structure:

Part I: Top 40 Companies

Part II: New Diversified Entrants

Part III: Strategic Group Analysis

O'Laughlin, Jay and Paul V. Ellefson

Part I: For. Prod. J. 31(10): 55-62, 1981

Part II: For. Prod. J. 31(11): 26-33, 1981

Part III: For. Prod. J. 31(12): 25-31, 1981

Part I is the first in a 3-part series to define the economic structure of the wood-based industry. The authors discuss the 40 largest U.S. companies in terms of 1978 sales of wood-based products and how much timberland they own. Part II identifies and discusses the significance of 12 large wood-based companies that have recently merged into the industry by acquiring existing companies. Part III compares these 12 companies with the more traditional types of wood-based companies. To make the comparison, the structure-conduct-performance dimensions of industrial organization economics are used.

40. FORDAT - An Information Retrieval System for Forest Economic Data

Spelter, Henry

USDA Gen. Tech. Rep. FPL 33, 1981

This paper describes a nationally available computerized system developed at FPL that provides data primarily on the production and consumption of wood products in the U.S.

41. Technological Innovation in Forest Industries: Part 1 and Part 2

Youngs, R. L.

Part 1: Power & Plant in Southern Africa: pp. 10, 11, 14-18, July 1981

Part 2: Power & Plant in Southern Africa: pp. 10, 12, 13, August 1981

In Part 1 the author discusses various wood technologies being developed or under modification that address national concerns of energy, economics, and environment. Part 2 reviews the state of the more popular wood structural panels as well as the truss-framed system for light-frame construction and machine stress-rated lumber.

packaging

42. Use of Oak in Linerboards

Bormett, D. W., D. J. Fahey, and J. F. Laundrie

USDA For. Serv. Res. Pap. FPL 410, 1981

This report on the basic behavior of pine and oak pulp mixtures in linerboard indicates that considerably more hardwood can be used in commercial linerboard production without sacrificing quality.

43. A Method for Compressive Creep Testing of Paperboard

Gunderson, Dennis E.

Tappi 64(11): 67-71, 1981

Existing instruments for measuring the effects of cyclic humidity on compressive creep behavior of corrugated board are inaccurate because they allow the specimen to buckle. This report describes a new FPL apparatus that uses a unique concept of lateral support to prevent specimen buckling.

44. The Principle of Load-Sharing in Corrugated Fiberboard

Urbanik, Thomas J.

Paperboard Packag. 66(11): 122-128, 1981

The principle of load-sharing is demonstrated with an experiment and used to explain why increasing the stiffness characteristics of paperboard sometimes has a negative effect on corrugated edgewise compressive strength.

processing

- drying
- sawing
- grading

45. Properties and Kiln-Drying Characteristics of Young-Growth Western Hemlock Dimension Lumber

Kozlik, Charles J. and James C. Ward

For. Prod. J. 31(6): 45-53, 1981

This information promotes a better understanding of drying properties of young-growth hemlock, which is needed before unseasoned hemlock lumber can be sorted for different drying schedules.

46. Importance of Relative Humidity and Temperature Control in Conditioning Wood Products

Simpson, William T.

Wood and Fiber 14(2): 94-103, 1982

An analysis is presented to determine the levels of relative humidity and temperature control necessary to maintain the equilibrium moisture content of solid and reconstituted wood within certain prescribed limits during conditioning.

47. Low-Cost Solar Dry Kiln Gets Trial in Sri Lanka

Simpson, William and John Tscherneitz

World Wood 23(1): 13, 1982

This article reports on a government enterprise in Horana, Sri Lanka, involving an FPL-designed solar dry kiln for rubberwood that has shortened drying time by about 50% and cost much less than a fuel-run kiln.

48. Economics of Manufacturing Straight Structural Lumber From Hardwoods

Harpole, George B., Robert R. Maeglin, and R. Sidney Boone

In: Utilization of Low-Grade Southern Hardwoods—Feasibility Studies of 36 Enterprises. Donald A. Stumbo, ed., Forest Products Res. Soc., pp. 156-162, 1981

A hypothetical, small log sawmill is used as a base for estimating processing costs, product recoveries, and heat-energy requirements for drying when the saw-dry-rip (SDR) concept is used for processing low-to medium-density hardwoods.

49. Investment Opportunity: A Scanning-Ultronics Cut Stock Manufacturing System

Harpole, George B. and Kent A. McDonald

USDA For. Serv. Res. Pap. FPL 390, 1981

This paper analyzes the economic prospects for commercialization of an ultrasonic system that would identify wood defects and help minimize wood waste in cutting operations.

50. Defect Detection in Lumber: State of the Art

Szymani, Ryszard and Kent A. McDonald

For. Prod. J. 31(11): 34-44, 1981

This state-of-the-art report defines and classifies lumber defects, specifies the requirements of an automated defect detection system, and describes various methods with potential for defect detection.

51. Potential Structural Quality of Trenching Lumber

Galligan, W. L., B. A. Bendtsen, L. I. Knab, F. Y. Yokel, and J. F. Senft

For. Prod. J. 31(5): 37-46, 1981

Lumber strength-reducing characteristics obtained from surveying trenching lumber are profiled. The work supports a much larger program by the National Bureau of Standards for the Occupational Safety and Health Administration on trenching materials.

52. Longitudinal Stress Waves for Lumber Stress Grading: Factors Affecting Applications: State of the Art

Gerhards, Charles C.

For. Prod. J. 32(2): 20-25, 1982

This paper summarizes published data on research with stress waves, highlights factors that affect stress-wave transit in lumber, and suggests some additional study.

pulp & paper

53. Fiber Orientation and Drying Restraint: Effects on Interlaminar Shear and Other Paper Properties

Byrd, Von L.

Research - Special Section of Svensk Papperstidning No. 15: 105-109, 1981

The influence of fiber orientation and drying restraint on interlaminar shear properties is investigated.

54. Press Drying of High-Yield Pulps: The Role of Parenchyma Cells

Horn, R. A.

Tappi 64(10): 105-108, 1981

This study showed that in press drying unbleached, high-yield kraft pulps, the parenchyma cells increase sheet strength properties but decrease sheet modulus of elasticity.

55. Measuring the Wetting Angle and Perimeter of Single Wood Pulp Fibers: A Modified Method

Klungness, John H.

Tappi 64(11): 65-66, 1981

A new, more rapid technique for measuring perimeters and determining wettability of pulp fibers is described.

56. Formation of Carbon-Linked and Anthrone-Lignin and Anthrahydroquinone-Lignin Adducts

Landucci, Lawrence L.

J. of Wood Chem. and Technol. 1(1): 61-74, 1981

This report continues the investigation of the mechanism of redox catalysis of delignification during alkaline pulping.

57. Soda-Amine Pulping: Reaction of Amines with Free Phenolic β -O-4 Ethers

Obst, John R.

Tappi 64(10):99-102, 1981

This paper presents the results of the reactions of free phenolic β -O-4 ether lignin models in soda-amine pulping liquors.

58. Fungal Decolorization of Kraft Bleach Plant Effluent: Fate of the Chromophoric Material

Sundman, Gabriel, T. Kent Kirk, and Hou-min Chang

Tappi 64(9): 145-148, 1981

Wastewater from the pulp and paper industry is readily decolored by the lignin-degrading fungi *Phanerochaete chrysosporium*. The authors investigate the fate of the color-bearing components during decolorization.

wood materials

59. Predicting Shear and Internal Bond Properties of Flakeboard

Geimer, R. L.

Holz als Roh- und Werkstoff 39: 409-415, 1981

An analysis is presented of interlaminar shear, rail shear, and internal bond data obtained from a 1979 FPL report on flakeboards having a uniform density throughout the thickness plane.

60. Wood Composites

Gillespie, Robert H.

From: Adhesion in Cellulosic and Wood-Based Composites, pp. 167-198, John F. Oliver, ed., NATA Conference Series VI: Material Science, Vol. 3, Plenum Press, New York, 1981

The author provides an overview of a complex subject: the critical properties of wood composites and how they are measured.

61. Parallel-Laminated Hardwood-Veneer for Furniture Frame Stock

Hoover, William L., Carl A. Eckelman, and John A. Youngquist

In: Utilization of Low-Grade Southern Hardwoods—Feasibility Studies of 36 Enterprises, pp. 105-112, Forest Products Res. Soc., Madison, Wis., 1981

A feasibility study was done on the production of hardwood laminated-veneer-lumber for furniture manufacture, indicating a great need for a highly automated production line that can produce a variety of panel shapes and sizes.

62. Manufacture of Thick Roof Decking From Oak Particles

Hoover, William L., Michael O. Hunt, and George B. Harpole

In: Utilization of Low-Grade Southern Hardwoods—Feasibility Studies of 36 Enterprises; Donald A. Stumbo, ed., Forest Products Res. Soc., pp. 193-201, 1981

This paper reports preliminary results of performance tests on full-size red-oak particleboard panels for use as roof decking and updates the economic feasibility of the product.

63. Developing Family of Flakeboard Products

Youngquist, John A.

From: Proceedings of the 15th Washington State University International Symposium on Particleboard, pp. 3-13, Pullman, Washington, 1981

The development of structural flakeboard products is discussed in light of the changing timber resource.

64. Laminated Wood-Based Composites

Youngquist, John A.

In: Kirk-Othmer: Encyclopedia of Chemical Technology, Vol. 14, 3rd ed., John Wiley and Sons, Inc., 1981

Design and production are described for glued and laminated structural members as well as such panel materials as insulation board, hardboard, paperboard, and particleboard.

65. Powered Back-Up Roll—An Improved Veneer Peeling Technology

Youngquist, John A.

South. Lmbrmn., Dec. 15, 1981

The author reports on the effectiveness of FPL's prototype powered back-up roll for use in preventing log spin-out in veneer lathes.

66. Press-Lam: Research Finds a New Furniture Feedstock

Youngquist, J. and R. Jokerst

Plywood & Panel 22(4): 8-10, 1981

This article reports on a study that showed hardwood Press-Lam (layers of thick-cut veneer bonded together) is well suited for use in upholstered furniture frame stock.

residues & energy

67. Forest Management Implications of Improved Residue Utilization: Biological Implications in Forest Ecosystems

Harvey, A. E., M. J. Larsen, and M. F. Jurgensen

From: USDA For. Serv. Gen. Tech. Rep. INT-110, Intermountain Forest and Range Experiment Station, Ogden, Utah, 1981

This research indicates that the need to maintain minimum reserves of soil organic matter may constrain timber utilization practices in harsh, cool, or dry ecosystems or in ecosystems with a severe fire or intensive logging history.

68. *Athelia epiphylla* Associated with Colonization of Subalpine Fir Foliage Under Psychrophilic Conditions

Larsen, M. J., M. F. Jurgensen, and A. E. Harvey

Mycologia 72(6): 1195-1202, 1981

This study documents the occurrence, association, and apparent effects of *Athelia epiphylla* Pers. on postharvest conifer residue under psychrophilic conditions in a northern Rocky Mountain coniferous forest.

69. Mill Residues

Risbrudt, Christopher D. and Thomas H. Ellis

In: CRC Handbook of Biosolar Resources, Vol. 2, pp. 527-536. CRC Press, Inc., Boca Raton, Fla. 1981

The properties, composition, abundance, economic importance, and use of mill residues are discussed.

Correction:

The previous edition of *Dividends from Wood Research*, dated July through December 1981, listed four recently initiated cooperative research programs that have no published findings to date. These programs are:

Improved Saw Blade Material

An Evaluation of the S-D-R Process for Converting Red Alder into Studs

Development of Saw-Dry-and Rip Concept for Paper Birch Studs and Furniture Squares

Stud Yield from Air-and Kiln-Dried Cottonwood Using the S-D-R System.

Dividends will again list the programs when publications become available.

cooperative research

Listed below are recent publications from universities or others involved in cooperative research with the Forest Products Laboratory. **Copies are not available from the Laboratory**, but may be obtained from the contacts listed following each publication.

The Dynamics of Residential Wood-Energy Use in New England 1970-2000

Marshall, Norman L.
RP #363, October 1981
Resource Policy Center, Thayer School of Engineering, Dartmouth College, Hanover, NH 03755

Market Pressures to Use Wood as an Energy Resource

Hewett, Charles E. and William T. Glidden, Jr.
Resource Policy Center, Thayer School of Engineering, Dartmouth College, Hanover, NH 03755. November 1981.

Wood Energy in the United States

Hewett, Charles, Colin High, Norman Marshall, and Robin Wildermuth
Resource Policy Center, Thayer School of Engineering, Dartmouth College, Hanover, NH 03755

Innovation and Product Diffusion in the Wood-Based Panel Industry

Leefers, L. A.
Ph.D. Thesis, 1981.
Michigan State University, Department of Forestry, East Lansing, MI 43324

Economic Potential of Dead Softwood Timber for Fiber and Wood-Based Products

Maloney, T. M., E. M. Huffaker, and R. J. Mahoney
Research Report No. 31/57-17, WSU Research Project No. 11D-3857-1808, November 1981
Washington State University, Department of Materials Science and Engineering, Wood Technology Section, Pullman, WA 99164

Isocyanate Binders for Particleboard Manufacture

Johns, W. E., T. M. Maloney, E. M. Huffaker, J. B. Saunders, and M. T. Lentz
From: Proceedings of 15th International Particleboard Symposium, 1981 Washington State University, Department of Materials Science and Engineering, Wood Technology Section, Pullman, WA 99164

Models for Fiberglass Reinforced Particleboard in Flexure

Buleit, William M.
From: Proceedings of 15th International Particleboard Symposium, 1981 Washington State University, Department of Materials Science and Engineering, Wood Technology Section, Pullman, WA 99164

The Concentration of Airborne Pentachlorophenol within Treated Wood Structures

Saur, James M., P. J. Walcheski, D. D. Nicholas, and L. R. Gjovik
From: Annual Meeting of the American Wood-Preservers' Association, 1982 Proceedings, Vol. 78
American Wood-Preservers' Association, 7735 Old Georgetown Rd., Bethesda, MD 20014

Migration of Creosote and its Components from Treated Piling Sections in a Marine Environment

Ingram, L. L., Jr., G. D. McGinnis, L. R. Gjovik, and G. Roberson
From: Annual Meeting of the American Wood-Preservers' Association, 1982 Proceedings, Vol. 78
American Wood-Preservers' Association, 7735 Old Georgetown Rd., Bethesda, MD 20014

Photodegradation and Photoprotection of Wood Surfaces

Shang-Tzen Chang, D. N.-S. Hon, and W. C. Feist
Wood and Fiber 14(2): 104-117, 1982
Department of Forest Products, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

Decay Patterns Observed in Butylene Oxide Modified Ponderosa Pine After Exposure in Unsterile Soil

Nilsson, Thomas, and R. M. Rowell
International Research Group, Document No: IRG/WP/3211
IRG Secretariat, Drottning Kristinas vag 47 C, S-114, 28, Stockholm, Sweden

Wood Preservation Statistics: Update

Micklewright, J. T. and L. R. Gjovik
From: Proceedings of the Annual Meeting of the American Wood-Preservers' Association, Vol. 77, pp. 143-147, 1981
American Wood-Preservers' Association, 7735 Old Georgetown Road, Bethesda, MD 20014

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